VALID UNTIL 5/4/07

APPENDIX 7- AIRPORT GROUND SUPPORT EQUIPMENT

Below is additional information pertaining to the Airport Ground Support Equipment (GSE) category under AQMD's FY 2007 Carl Moyer Program (CMP). All information in PA 2007-08 and this Appendix apply. For additional detail regarding this program category, refer to CARB's 2005 CMP Guidelines. In the case of any conflict between CARB guidelines and AQMD criteria, the more stringent criteria will prevail.

Applicants are further cautioned that CARB recently adopted New Emission Standards, Fleet Requirements, and Test Procedures For Forklifts And Other Industrial Equipment. Depending on the status of a regulated entity's fleet rule compliance, these vehicles may no longer be eligible for Moyer Program funding. Projects for applicants subject to the ARB Fleet Rules will be evaluated on a case-by-case basis to determine if there are any surplus emissions that remain eligible for Moyer Program incentives.

It is the Applicant's responsibility to check with AQMD's CMP web page for program clarifications, changes and updates. This page may be accessed by clicking the link on AQMD's home page at http://www.aqmd.gov/tao/implementation/carl_moyer_program_2001.html.

CARB MOYER PROGRAM RESOURCES

Applicants are highly encouraged to review CARB guidelines for additional requirements of the CMP. CARB guidelines are incorporated into AQMD's Moyer Program by reference. The 2005 CARB guidelines may be downloaded from:

http://www.arb.ca.gov/msprog/moyer/guidelines/revisions05.htm

On this web page, there are links to the four parts of the CARB 2005 CMP guidelines. These parts are described below for easy reference.

- Part I provides the Executive Summary, Program Overview and Administrative Requirements primarily applicable to air districts) for CARB's Carl Moyer Program. The link to Part I is http://www.arb.ca.gov/msprog/moyer/guidelines/2005_Carl_Moyer_Guidelines_Part1.pdf

- Part II provides the Project Criteria for each program category. The link to Part II is http://www.arb.ca.gov/msprog/moyer/guidelines/2005_Carl_Moyer_Guidelines_Part2.pdf

- Part III provides the Agricultural Assistance Program guidelines. Link to Part III at http://www.arb.ca.gov/msprog/moyer/guidelines/2005_Carl_Moyer_Guidelines_Part3.pdf

- Part IV is the Appendices section of the guidelines. The link to Part IV is http://www.arb.ca.gov/msprog/moyer/guidelines/2005_Carl_Moyer_Guidelines_Part4.pdf . This section includes the following Appendices.

    - Appendix A – Acronyms
    - Appendix B – Tables for Emission Reduction and Cost-Effectiveness Calculations
    - Appendix C – Cost-Effectiveness Calculation Methodology
    - Appendix D – Example Calculations
    - Appendix E – Description of Certification and Verification Executive Orders
    - Appendix F – Retrofit Emission Control Strategies
    - Appendix G – Description of Functional Equivalency of Non-Original Equipment Manufacturer Repowers and Rebuilt Engines for use in Repowers

HIGHLIGHTS FOR 2007

Reduced-emission ground support equipment projects which include purchase of new electric GSE, repowers of existing GSE with cleaner IC engines and engine retrofit, can be considered for incentive funding.

- The project cost-effectiveness limit is $14,300 per weighed ton of NOx, PM and ROG emissions reduced. A four (4) percent capital recovery factor is used for the cost-effectiveness calculation.

- Cost-effectiveness calculations are based on particulate matter (PM10), oxides of nitrogen (NOx), and reactive organic gases (ROG). The formula is provided below. AQMD staff will calculate the NOx, PM and ROG emissions reductions during the evaluation process.

Annualized Cost ($/year)

NOx reductions + 20(combustion PM10 reductions) + ROG reductions (tons/year)

- Applicants **must** provide current vendor quotes, **obtained within the last 90 days**, with their application to document the incremental cost of implementing the proposed technology. This will require documentation of both the baseline and low-emission project costs. Applicants can request funding up to the full differential cost between an optionally certified low-emission vehicle/engine/equipment and its new base standard emission equivalent; however, less may actually be awarded, depending on the results of the cost-effectiveness evaluation.

- Applicants **must** also provide documentation covering the past two years that justifies the activity level projected for the vehicles (i.e., mileage logs, hour-meter records, business records, fuel receipts, etc.). Specifically, stop-and-go vehicle projects (i.e., refuse, street sweeper) that utilize a fuel-based calculation must provide fuel receipts for the past two years to justify the fuel consumption activity projected for the vehicle.

- All projects must be operational within eighteen (18) months of contract execution or by May 31, 2009, whichever is earlier.

- The new engine/equipment/vehicle must not have been purchased prior to the effective date of the contract.

- AQMD reserves the right to disqualify any application that does not comply with all applicable requirements including submission of a complete application package. For GSE, this includes the main application as well as the information requested in Attachment 7 to the main application.

- AQMD will only fund new electric GSE, repowers or retrofits of existing engines under this PA.

- As indicated earlier, diesel engine *retrofits* with CARB-verified systems are eligible for program funding. The AQMD Moyer Program will fund the cost of purchase and installation of a CARB-verified diesel emission control device, not exceeding the CMP cost-effectiveness limit. Retrofit projects that control PM must use the highest level cost-effective technology available for the equipment being retrofitted.

  In order to include NOx emission reductions in the cost-effectiveness evaluation, the technology must be verified to reduce NOx emissions by at least 15 percent compared to the original engine certification level.

- The cost of the retrofit, and all filters needed during the project life, may be paid for with Carl Moyer Program funding provided it meets the weighted cost-effectiveness limit. CARB also determined that filter cleaning is an eligible cost provided the inclusion of the cost for filter cleaning, which may include the cost of service to clean the filter or a filter cleaning machine, does not exceed the cost-effectiveness limit.

EVALUATION METHODOLOGY

AQMD staff will evaluate all submitted proposals and make recommendations to the Governing Board for final selection of project(s) to be funded. Proposals will be evaluated based on the cost-effectiveness of emissions (NOx + ROG + 20*PM) reduced on an equipment-by-equipment basis, as well as a project's "disproportionate impact" evaluation (discussed below). Be aware of the possibility that due to program priorities and/or funding limitations, project applicants may be offered only partial funding, and not all proposals that meet minimum cost-effectiveness criteria may be funded.

In compliance with AB 1390, Firebaugh, the FY 2007 CMP requires that at least 50 percent of the funds be spent in areas that are disproportionately impacted by air pollution. CARB has issued broad goals and left the details of how to implement this requirement to each air agency. In the South Coast Air Quality Management District, the disproportionately impacted areas are defined by a weighted formula that includes poverty level, particulate matter exposure and toxic exposure. The process is described below:

1. All projects must qualify for the CMP by meeting the cost-effectiveness limits established in the PA.

2. All projects will be evaluated according to the following criteria to qualify for Disproportionate Impact funding:

    a. Poverty Level: All projects in areas where at least 10 percent of the population falls below the Federal poverty level based on the year 2000 census data, will be eligible to be included in this category, and

    b. PM Exposure: All projects in areas with the highest 15 percent of PM concentration will be eligible to be ranked in this category. The highest 15 percent of PM concentration is 46 micrograms per cubic meter and above, on an annual average, or

c. Toxic Exposure: All projects listed in the Multiple Air Toxics Exposure Study in the South Coast Air Basin (MATES II) report[1] as having a cancer risk of 1,000 in a million and above will be eligible to be ranked in this category.

Data for the poverty level and PM and toxic exposures were obtained from the U.S. Census, the 1998 AQMD monitoring data and Mates II study respectively.

3. Fifty percent of the funding available for this PA will be allocated among proposals located in disproportionately impacted areas. If the funding for disproportionately impacted areas is not exhausted with the outlined methodology, then staff will return to the Governing Board for direction. If funding requests exceed 50 percent of the total available funding, then all qualified projects will be ranked based on their disproportionate impact. Each project will be assigned a score that is comprised of 40 percent for poverty level, and 30 percent each for PM and toxic exposures. Proposals with the highest scores will receive funding until 50 percent of the total funding is allocated.

   All the proposals not awarded under the fifty percent disproportionate impact funding analysis will then be ranked according to cost-effectiveness, with the most cost-effective project funded first and then in descending order for each funding category until the remainder of the CMP Funds are exhausted. Some projects that exceed the cost-effectiveness ceiling may receive partial funding, depending on their rankings.

ELIGIBLE COSTS

Eligible project costs (i.e., costs for which CMP funding is requested) are limited to the incremental cost of a project to implement the reduced emission technology. Operation and maintenance costs are not eligible for CMP funding, except for retrofit projects where filter cleaning is considered an eligible cost. CARB determined that filter maintenance is an eligible cost for retrofit projects provided the inclusion of the cost for filter cleaning, which may include the cost of service to clean the filter or a filter cleaning machine, does not exceed the cost-effectiveness limit. Please refer to the Project Types section below for additional detail.

PROJECT LIFE

The minimum project life is three years. Project life must be equivalent to contract life.

[1] Multiple Air Toxics Exposure Study in the South Coast Air Basin (MATES II), SCAQMD, March 2000.

REPORTING AND MONITORING

All participants in the CMP are required to keep appropriate records during the full contract period. Project life is the number of years used to determine the cost-effectiveness and is equivalent to the contract life. All equipment must operate in the AQMD for this full project life. Annual records must contain, at a minimum:

- Total hours of operation in the South Coast Air Basin
- Annual fuel consumed
- Annual maintenance and repair information

Records must be retained and updated throughout the project life and made available for AQMD inspection. The AQMD may conduct periodic reviews of each vehicle/equipment project's operating records to ensure that the vehicle is operated as stated in the program application.

COST-EFFECTIVENESS EVALUATION DISCUSSION

Cost-effectiveness calculations are based on particulate matter (PM10), oxides of nitrogen (NOx), and reactive organic gases (ROG). The new formula established by CARB is highlighted above. AQMD staff will calculate the NOx, PM and ROG emissions reductions and apply the new formula during the evaluation process. Only CMP funds are to be used in determining cost-effectiveness[2]. The one-time incentive grant amount is to be amortized over the project life (which is also the contract term) at a discount rate of 4 percent. The amortization formula (given below) yields a capital recovery factor (CRF), which, when multiplied by the initial capital cost, gives the annual cost of a project over its project term.

$$CRF = [(1 + i)^n (i)] / [(1 + i)^n - 1]$$

where

i = discount rate (4 percent)
n = project life (at least 3 years)

Table 7.1 lists the CRF for different project lives using a discount rate of 4 percent. Cost-effectiveness is determined by dividing the annualized costs of a project by the annual weighted emission reductions offered by the project.

[2] Unless the AQMD "buys down" the cost of the project by adding additional funding, in which case the total grant funding amount should be used for the cost-effectiveness calculation.

Table 7.1 – Capital Recovery Factors (CRF) for Various Project Lives At 4 Percent Discount Rate

Project Life	CRF
3	0.360
4	0.275
5	0.225
6	0.191
7	0.167
8	0.149
9	0.134
10	0.123
11	0.114
12	0.107
13	0.100
14	0.095
15	0.090
16	0.086
17	0.082
18	0.079
19	0.076
20	0.074

RECENT AND UPCOMING REGULATIONS

- In late 2002, air carriers operating in the South Coast air basin signed a memorandum of understanding (MOU) with ARB committing to reduce HC and NOx emissions from new and in-use GSE used in airport operations. The MOU was intended to address the air carriers' contributions to the air basin's extreme ozone nonattainment classification. The airlines terminated the MOU on October 28, 2005. The recently adopted regulation on Fleet Requirements, and Test Procedures for Forklifts and other Industrial Equipment is intended to achieve the same emissions reductions from GSE fleets in the South Coast air basin as were project under the MOU. Applicants are responsible for ensuring that they meet all regulatory requirements and emissions reductions are in fact surplus.
- CARB is developing a control measure to reduce diesel particulate matter emissions from in-use, off-road, diesel-fueled, mobile equipment greater than or equal to 25 horsepower. This includes, but is not limited to, construction equipment, mining equipment, airport ground support equipment, and industrial equipment such as forklifts. The proposal will not cover equipment used in agricultural operations, cargo handling at ports and intermodal rail facilities, or equipment already covered by an in-use rule or agreement. This item is scheduled to be heard by the Board in May 2007. If approved, it will likely affect project criteria for off-road projects.

POTENTIAL PROJECTS

Airport GSE emissions can also be decreased by retrofitting the equipment with a PM filter, diesel oxidation catalyst or a three-way catalyst. For instance, catalysts have been added to SI GSE to meet the current LSI emission standards. In addition, to reduce emissions GSE can be repowered with a new, cleaner IC engines.

The Carl Moyer Program will fund the purchase of electric GSE, as well as GSE repower and retrofit projects if this equipment is not subject to any existing or planned regulations, funded through another incentive program, or used to generate credits of any type. In addition, projects that are surplus to the emission reductions required under the new regulation are eligible for funding. Carts, lavatory carts and air-start units each represent a smaller fraction of the GSE equipment inventory. Fuel, utility, water, and service trucks are not covered under the current airport GSE guidelines, but may be considered under the on-road vehicle category (Appendix 1).

PROJECT CRITERIA

Since potential GSE projects could involve either CI or SI engines, eligibility criteria for GSE would be dependent on the base engine of the GSE and any regulatory requirements, including fleet requirements, applicable to the GSE category. For projects involving CI GSE, please refer to Chapter 5. Note that in addition to meeting the project criteria for off-road CI equipment, GSE projects applied for by applicants subject to the any adopted regulations.

Airport GSE projects funded by the Carl Moyer Program must meet a cost-effectiveness of $14,300 per weighed ton of NOx + ROG + combustion PM10 reduced calculated in accordance with the cost-effectiveness methodology discussed in the Guidelines.